Claims

1. A method for manufacturing a light guide, in particular a backlighting or frontlighting light guide for user interfaces of electronic devices, wherein an light guiding substrate is provided as a foil, and
wherein diffractive gratings are embossed on at least one side of said foil by rolling.

2. The method of claim 1, wherein said diffractive gratings are embossed into said foil in a continuous pattern.

3. The method of any one of claims 1 or 2, wherein said foil is provided for rolling continuously from a bobbin.

4. The method of any one of claims 1 to 3, wherein additional optical films are partially laminated onto said embossed foil after said rolling.

5. The method of claim 4, wherein said additional optical films are provided for lamination continuously from a bobbin.

6. The method of one of claims 4 or 5, wherein said additional optical films are partially laminated onto said embossed foil by heating and/or glueing.

7. The method of any one of claim 4 to 6, wherein said optical films are laminated onto said foil at least partially along the outer edges of said foil.

8. The method of any one of claims 4 to 7, wherein said optical films are laminated onto said foil at least partially at corners of segments of said foil.

9. The method of any one of claims 1 to 8, wherein said lamination includes laminating additional optical films onto at least one side of said foil.

10. The method of any one of claims 1 to 9, wherein first optical films are laminated onto a first side of said foil.

11. The method of claim 10, wherein said first optical films are diffuser films and/or brightness enhancement films.

12. The method of any one of claims 1 to 11, wherein second optical films are laminated onto a second side of said foil.

13. The method of claim 12, wherein said second optical film is a reflector film.

14. The method of any one of claims 1 to 13, wherein individual light guides are separated from said foil by stamping or cutting.

15. The method of any one of claims 1 to 14, wherein individual light guides are separated from said foil during lamination.

16. The method of any one of claims 1 to 15, wherein diffractive in-coupling gratings are embossed into said foil by said rolling, so as to provide coupling in of light from lighting elements lighting at a certain angular distribution to said surface of said foil into said foil.

17. The method of claim 16, wherein through holes are cut out of at least one of said optical films at positions of said diffractive in-coupling gratings during segmentation of said light guides.

18. The method of any one of claims 1 to 17, wherein through holes are cut out of at least parts of individual light guides at positions where side firing lighting elements are to be positioned, to enable in-coupling of light into said light guide by side firing lighting elements.

19. The method of any one of claims 1 to 18, wherein said foil is rolled at a speed between 0,1 - 100 m/min.

20. The method of any one of claims 1 to 19, wherein said gratings are embossed by rotogravure offset or flexo-printing.

21. The method of any one of claims 1 to 20, wherein the height of said gratings is between 0,1 to 1 μm.

22. The method of any one of claims 1 to 21, wherein said foil and/or said optical films comprise at least one of the materials Polycarbonate (PC), Polymethylacrylate (PMMA), Polyvinylchloride (PVC), Polyethylene (PE), Polyethyleneterephthalate (PET), or thermoplastic Polyester.

23. The method of any one of claims 1 to 22, wherein said foil and/or said optical films have a refractive index between 1,3 and 1,8.

24. The method of any one of claims 1 to 23, wherein a rolling temperature is adjusted to allow embossing said gratings into said foil at rolling speed.

25. The method of any one of claims 1 to 24, wherein said diffractive gratings are embossed into parts of said foil and wherein electronic and/or opto-electronic components are printed onto parts of said foil.

26. The method of claim 25, wherein said electronic and/or opto-electronic components are printed onto said foil by an additional rolling process and/or an additional printing process.

27. The method of any one of claims 1 to 26, wherein parts of said foil are extended to be used as means for transporting optical signals and/or light to out-coupling elements.

28. An apparatus for manufacturing a light guide, in particular a backlighting or frontlighting light

guide for user interfaces of electronic devices, comprising:
first supply means providing a light guiding substrate as a foil, and
rolling means for embossing diffractive gratings on at least one side of said foil.

29. The apparatus of claim 28, with a bobbin providing said foil substantially continuously.

30. The apparatus of one of claims 28 or 29, with lamination means laminating additional optical films onto said embossed foil after rolling.

31. The apparatus of any one of claims 28 to 30, with second and/or third supply means providing said additional optical films on either side of said foil.

32. The apparatus of any one of claims 28 to 31, with cutting means cutting individual light guides of said foil after laminating said foil with said additional optical films.

33. The apparatus of any one of claims 28 to 32, with stamping means stamping individual light guides of said foil after laminating said foil with said additional optical films.

34. The apparatus of any one of claims 28 to 33, wherein said cutting means or said stamping means are integrated within said lamination means, segmenting said foil during lamination.

35. The apparatus of any one of claims 28 to 34, wherein said rolling means provide areas of diffractive grating patterns onto said foil.

36. A system for manufacturing a light guide, in particular a backlighting or frontlighting light guide for user interfaces of electronic devices, in particular with an apparatus according to any one of claims 19 to 27 comprising:
supply means providing a light guiding substrate as a foil, and
rolling means for embossing diffractive gratings on at least one side of said foils.

37. A light guide, in particular a backlighting or frontlighting light guide for user interfaces of electronic devices, manufactured by embossing diffractive gratings on at least one side of a foil of light guiding substrate by rolling, in particular according to a method of any one of claims 1 to 19.

38. The light guide of claim 37, manufactured by laminating additional optical films on at least one side of said foil.

39. The light guide of any one of claims 37 or 38, with optical films laminated at least along outer edges and/or at corners of segments of said foil.

40. The light guide of any one of claims 37 to 39, with through holes in at least one of said additional optical films for in-coupling of light into said light guide from lighting elements lighting at a

certain angle distribution to said surface of said foil into said foil.

41. The light guide of any one of claims 37 to 40, with through holes cut out of said foil and/or said films at positions where side firing lighting elements are to be positioned to enable in-coupling of light into said light guide by side firing lighting elements.

42. Mobile communications equipment comprising a light guide according to any one of claims 37 to 41.